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SANGCHRIS LAKE, CHRISTIAN COUNTY, ILLINOIS

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U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY

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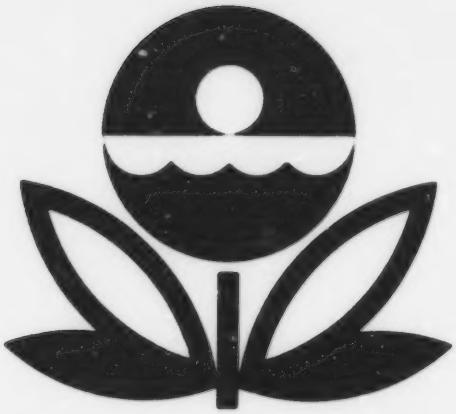

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REPORT
ON
SANGCHRIS LAKE
CHRISTIAN COUNTY
ILLINOIS
EPA REGION V
WORKING PAPER No. 314

WITH THE COOPERATION OF THE
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
AND THE
ILLINOIS NATIONAL GUARD
JUNE, 1975

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F O R E W O R D

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nation-wide threat of accelerated eutrophication to fresh water lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the Illinois Environmental Protection Agency for professional involvement and to the Illinois National Guard for conducting the tributary sampling phase of the Survey.

Dr. Richard H. Briceland, Director of the Illinois Environmental Protection Agency; and Ronald M. Barganz, State Survey Coordinator, and John J. Forneris, Manager of Region III, Field Operations Section of the Division of Water Pollution Control, provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

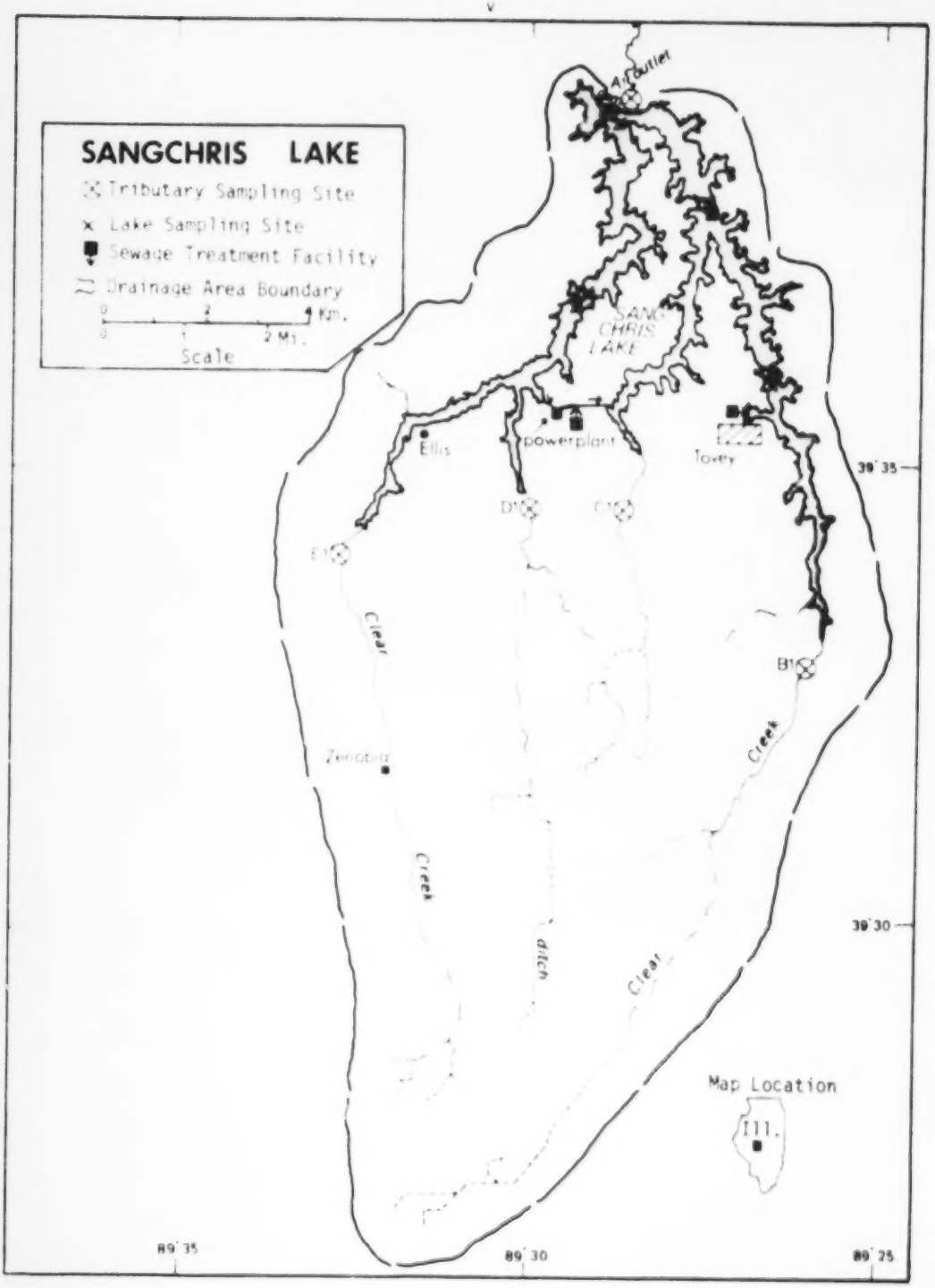
Major General Harold R. Patton, the Adjutant General of Illinois, and Project Officer Colonel Daniel L. Fane, who directed the volunteer efforts of the Illinois National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF ILLINOIS

LAKE NAME	COUNTY
Baldwin	Randolph
Bloomington	McLean
Carlyle	Bond, Clinton, Fayette
Cedar	Lake
Charleston	Coles
Coffeen	Montgomery
Crab Orchard	Jackson, Williamson
Decatur	Macon
DePue	Bureau
East Loon	Lake
Fox	Lake
Grass	Lake
Highland Silver	Madison
Holiday	LaSalle
Horseshoe	Madison
Long	Lake
Lou Yaeger	Montgomery
Marie	Lake
Old Ben Mine	Franklin
Pistakee	Lake, McHenry
Raccoon	Marion
Rend	Franklin, Jefferson
Sangchris	Christian
Shelbyville	Moultrie, Shelby
Slocum	Lake
Springfield	Sangamon
Storey	Knox
Vandalia	Fayette
Vermilion	Vermilion
Wee Ma Tuk	Fulton
Wonder	McHenry


SANGCHRIS LAKE
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
Drainage Area Boundary
Scale
Km.
Mi.
A-Outlet
SANG CHRIS LAKE
Ellis
powerplant
Toxey
D1
C1
E1
B1
Clear
Creek
Zemobia
Creek
Clear
Creek
Clear
Map Location
Ill.
39°35
39°30
89°35
89°30
89°25

SANGCHRIS LAKE

STORET NO. 1753

I. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Sangchris Lake is eutrophic. It ranked sixth in overall trophic quality when the 31 Illinois lakes sampled in 1973 were compared using a combination of six parameters*. Three lakes had less and one had the same median total phosphorus, one had less median dissolved phosphorus, 21 had less median inorganic nitrogen, 13 had less mean chlorophyll a, and ten had a greater mean Secchi disc transparency. Marked depression of dissolved oxygen with depth occurred at sampling stations 1 and 2 in August.

Survey limnologists noted blue-green algal concentrations in August and rooted aquatic vegetation along about 5% of the shoreline.

B. Rate-Limiting Nutrient:

The algal assay results indicate that Sangchris Lake was phosphorus limited at the time the sample was collected (05/07/73). These results are substantiated by the lake data. On all sampling dates, the mean N/P ratios were 35/1 or greater, and limitation by phosphorus would be expected.

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* See Appendix A.

C. Nutrient Controllability:

1. Point sources--The estimated phosphorus contribution from known point sources amounted to nearly 6.5% of the total reaching Sangchris Lake during the sampling year, and essentially all of the point-source input was the estimated Commonwealth Edison Kincaid (generating) Station wastewater treatment plant phosphorus load.

The present phosphorus loading rate of 0.38 $g/m^2/yr$ is just in excess of the rate proposed by Vollenweider (Vollenweider and Dillon, 1974) as a eutrophic rate (see page 14), and it is calculated that removal of 80% of the phosphorus at the two point sources included in this study would reduce the loading to a rate just equal to the eutrophic rate. However, because the Kincaid station phosphorus load was estimated, and because the Tovey Pumphouse wastewater treatment plant flows also were estimated, a more-detailed study of the point-source phosphorus contributions to Sangchris Lake is needed to determine the feasibility of phosphorus control.

2. Non-point sources--About 59% of the total phosphorus input to Sangchris Lake came from gaged non-point sources during the sampling year. Clear Creek (eastern) and Clear Creek (western) each contributed over 20% and the unnamed stream (D-1) contributed nearly 10% of the total. Ungaged tributaries were estimated to have contributed 30.2% of the total phosphorus input.

In all, non-point sources, including precipitation, were estimated to have contributed over 93% of the total phosphorus load to Sangchris Lake during the sampling year.

The phosphorus export rates of the Sangchris Lake tributaries were relatively low and are comparable to the rates of other unimpacted tributaries sampled in the Sangamon River drainage; e.g., Panther Creek and Lick Creek (tributaries of nearby Lake Springfield*) had phosphorus export rates of 20 and 28 kg/km^2/yr, respectively.

* Working Paper No. 317.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS[†]

A. Lake Morphometry[††]:

1. Surface area: 10.93 kilometers^2.
2. Mean depth: 4.0 meters.
3. Maximum depth: >10.0 meters.
4. Volume: 43.720 x 10^6 m^3.
5. Mean hydraulic retention time: 1.2 years.

B. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
Clear Creek (eastern)	36.0	0.2
Unnamed Creek (C-1)	15.5	0.1
Unnamed Creek (D-1)	20.7	0.1
Clear Creek (western)	32.6	0.2
Minor tributaries & immediate drainage -	73.1	0.6
Totals	177.9	1.2

2. Outlet -

Clear Creek	188.8**	1.2

C. Precipitation***:

1. Year of sampling: 114.3 centimeters.
2. Mean annual: 88.1 centimeters.

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† Table of metric conversions--Appendix B.
†† Simms, 1975.
* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".
** Includes area of lake.
*** See Working Paper No. 175.

III. LAKE WATER QUALITY SUMMARY

Sangchris Lake was sampled three times during the open-water season of 1973 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from four stations on the lake and from a number of depths at each station (see map, page v). During each visit, a single depth-integrated (4.6 m or near bottom to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the first visit, a single 18.9-liter depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 10.1 meters at station 1, 8.8 meters at station 2, 4.6 meters at station 3, and 5.5 meters at station 4.

The lake sampling results are presented in full in Appendix D and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR LAKE SANGCHRIS
STORET CODE 1753

PARAMETER	1ST SAMPLING (5/ 7/73) 4 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (8/10/73) 4 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (10/16/73) 4 SITES RANGE	MEAN	MEDIAN
TEMP (C)	16.5 - 18.9	17.8	18.3	24.3 - 32.2	29.4	29.2	18.8 - 22.4	20.6	20.2
DISS OXY (MG/L)	7.8 - 8.8	8.4	8.2	0.5 - 8.4	6.0	6.9	7.2 - 8.8	7.6	7.4
CNDCTVY (MCROMO)	335. - 380.	371.	380.	353. - 454.	424.	424.	380. - 418.	399.	399.
PH (STAND UNITS)	8.0 - 8.1	8.0	8.0	7.2 - 8.9	8.3	8.3	7.9 - 8.4	8.0	8.0
TOT ALK (MG/L)	64. - 79.	74.	77.	93. - 105.	98.	97.	88. - 94.	91.	91.
TOT P (MG/L)	0.079 - 0.156	0.113	0.109	0.021 - 0.134	0.045	0.042	0.035 - 0.065	0.047	0.044
ORTHO P (MG/L)	0.023 - 0.042	0.028	0.025	0.005 - 0.011	0.007	0.006	0.005 - 0.012	0.009	0.008
NO2+NO3 (MG/L)	4.250 - 4.510	4.309	4.300	1.670 - 2.000	1.891	1.910	0.100 - 0.320	0.272	0.290
AMMONIA (MG/L)	0.070 - 0.140	0.090	0.080	0.030 - 0.390	0.079	0.045	0.030 - 0.060	0.038	0.040
KJEL N (MG/L)	0.480 - 0.700	0.529	0.500	0.600 - 1.200	0.843	0.800	0.400 - 0.900	0.585	0.600
INORG N (MG/L)	4.330 - 4.600	4.399	4.385	1.880 - 2.060	1.969	1.970	0.140 - 0.360	0.311	0.330
TOTAL N (MG/L)	4.650 - 5.010	4.838	4.835	2.540 - 3.000	2.734	2.725	0.680 - 1.190	0.857	0.820
CHLRPYL A (UG/L)	2.5 - 4.3	3.2	3.1	26.6 - 48.8	39.0	40.3	12.4 - 22.3	15.6	13.9
SECCHI (METERS)	0.1 - 0.3	0.2	0.2	0.7 - 0.9	0.8	0.9	0.9 - 0.9	0.9	0.9

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal units per ml
05/07/73	1. Melosira sp.	2,718
	2. Stephanodiscus sp.	264
	3. Coccoid Chrysophyta	171
	4. Synedra sp.	98
	5. Cryptomonas sp.	73
	Other genera	150
	Total	3,474
08/10/73	1. Oscillatoria sp.	52,083
	2. Dactylococcopsis sp.	21,412
	3. Nitzschia sp.	926
	4. Cyclotella sp.	926
	5. Melosira sp.	463
	Other genera	1,967
	Total	77,777
10/18/73	1. Melosira sp.	4,613
	2. Flagellates	1,764
	3. Merismopedia sp.	779
	4. Synedra sp.	287
	5. Centric diatoms	410
	Other genera	2,114
	Total	9,967

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (µg/l)
05/07/73	01	2.8
	02	3.4
	03	2.5
	04	4.3
08/10/73	01	40.6
	02	40.0
	03	48.8
	04	26.6
10/18/73	01	12.4
	02	14.9
	03	22.3
	04	12.9

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.020	3.885	7.9
0.050 P	0.070	3.885	26.6
0.050 P + 1.0 N	0.070	4.885	29.2
1.0 N	0.020	4.885	8.2

2. Discussion -

The control yield of the assay alga, Selenastrum capricornutum, indicates that the potential primary productivity of Sangchris Lake was high at the time the sample was collected (05/07/73). A significant increase in yield occurred with the addition of phosphorus alone, but the addition of nitrogen alone did not result in a significant difference in

yield as compared to the control. Therefore, phosphorus limitation is indicated.

The lake data further indicate phosphorus limitation. At all sampling times, the mean ratios of inorganic nitrogen to orthophosphorus were 35 to 1 or greater.

IV. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the Illinois National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff months of February and March when two samples were collected. Sampling was begun in June, 1973 and was completed in May, 1974.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Illinois District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*.

Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the means of the nutrient loads, in $kg/km^2/year$, at stations B-1, C-1, and D-1 and multiplying the means by the ZZ area in km^2.

The operators of the Commonwealth Edison Kincaid Station and Tovey Pumphouse wastewater treatment plants provided monthly effluent samples and flow data. However, the flow data provided for the generating

* See Working Paper No. 175.

station included the large-volume condenser discharge, and waste treatment plant loads could not be calculated. Consequently, nutrient loads were estimated at 1.134 kg P and 3.401 kg N/capita/year.

Also, the flows provided for the Tovey Pumphouse treatment plant were estimated.

A. Waste Sources:

1. Known treatment plants* -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Commonwealth Edison Station	208	trickling filter	2.6×10^6**	Sangchris Lake
Tovey Pumphouse	520	stab. pond	181.7***	Sangchris Lake

2. Known industrial - None

* Stober, 1973.
** Includes condenser discharge.
*** Operator's estimate.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
Clear Creek (eastern)	850	20.3
Unnamed Creek (C-1)	140	3.3
Unnamed Creek (D-1)	400	9.6
Clear Creek (western)	1,070	25.5
b. Minor tributaries & immediate drainage (non-point load) -	1,265	30.2
c. Known treatment plants -		
Commonwealth Edison Station	235	5.6
Tovey Pumphouse	35	0.8
d. Septic tanks* -	5	0.1
e. Known industrial - None	-	-
f. Direct precipitation** -	190	4.6
Total	4,190	100.0

2. Outputs -

Lake outlet - Clear Creek	2,590

3. Net annual P accumulation - 1,600 kg.

* Estimate based on 14 lakeshore dwellings and 1 park; see Working Paper No. 175.

** See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/ yr	% of total
a. Tributaries (non-point load) -		
Clear Creek (eastern)	47,450	18.8
Unnamed Creek (C-1)	17,950	7.1
Unnamed Creek (D-1)	28,070	11.1
Clear Creek (western)	52,330	20.7
b. Minor tributaries & immediate drainage (non-point load) -	93,375	37.0
c. Known treatment plants -		
Commonwealth Edison Station	705	0.3
Tovey Pumphouse	400	0.2
d. Septic tanks* -	185	<0.1
e. Known industrial - None	-	-
f. Direct precipitation** -	11,800	4.7
Total	252,265	100.0

2. Outputs -

Lake outlet - Clear Creek 129,190

3. Net annual N accumulation - 123,075 kg.

* Estimate based on 14 lakeshore dwellings and 1 park; see Working Paper No. 175.
** See Working Paper No. 175.

D. Mean Annual Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km²/yr	kg N/km²/yr
Clear Creek (eastern)	24	1,318
Unnamed Creek (C-1)	9	1,158
Unnamed Creek (D-1)	19	1,356
Clear Creek (western)	33	1,605

E. Yearly Loading Rates:

In the following table, the existing phosphorus loading rates are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" rate is the rate at which the receiving water would become eutrophic or remain eutrophic; his "permissible" rate is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic rate would be considered one between "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m²/yr	0.38	0.15	23.1	11.3

Vollenweider loading rates for phosphorus (g/m²/yr) based on mean depth and mean hydraulic retention time of Sangchris Lake:

"Dangerous" (eutrophic rate)	0.36
"Permissible" (oligotrophic rate)	0.18

V. LITERATURE REVIEWED

Simms, Neil, 1975. Personal communication (lake morphometry). Commonwealth Edison, Kincaid.

Stober, W. G., 1973. Treatment plant questionnaire (Commonwealth Edison station and Tovey pumphouse STP's). Kincaid.

Vollenweider, R. A., and P. J. Dillon, 1974. The application of the phosphorus loading concept to eutrophication research. Natl. Res. Council of Canada Publ. No. 13690, Canada Centre for Inland Waters, Burlington, Ontario.

VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN ANALYSIS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG P	500-MEAN ALK	MEAN CHLORA	1/2-MIX DEP	MEDIAN SECCHI DEPTH
1703	LAKE BLOOMINGTON	0.050	0.730	400.667	20.720	14.000	0.070
1705	LAKE CARLTON	0.044	1.270	477.444	17.317	11.000	0.032
1708	LAKE CHARLESTON	0.100	0.440	440.667	12.000	8.400	0.060
1711	COFFEEN LAKE	0.031	0.140	450.222	7.700	14.400	0.062
1712	CHAUTAUQUA LAKE	0.032	0.200	401.222	29.867	13.000	0.033
1714	LAKE DECATUR	0.124	1.750	479.571	41.030	14.500	0.050
1715	LONG LAKE	0.704	1.140	401.000	44.333	8.400	0.040
1716	LAKE LOU YAEGER	0.134	1.100	403.500	10.442	11.400	0.070
1717	LAKE MAHIE	0.044	0.170	401.667	14.533	14.700	0.057
1721	PISTAKEE LAKE	0.021	0.170	401.667	25.867	7.000	0.062
1723	HENRY LAKE	0.071	0.210	471.500	23.233	12.700	0.042
1724	LAKE SHELBYVILLE	0.052	1.240	401.333	17.161	14.400	0.031
1740	SILVER LAKE (MISSAUKEE)	0.220	0.470	404.500	5.862	14.000	0.057
1742	LAKE SPRINGFIELD	0.104	1.265	401.333	11.013	10.400	0.054
1744	VERMILION LAKE	0.104	0.445	401.000	31.150	14.200	0.050
1750	MONROE LAKE	0.024	0.040	401.000	10.533	7.400	0.130
1751	LAKE STORY	0.072	0.310	404.333	17.252	14.400	0.021
1752	DEVIL LAKE	0.041	0.050	440.000	10.833	5.400	0.270
1753	LAKE SANDUSKY	0.050	1.470	475.417	19.242	14.500	0.080
1754	LAKE MILLICENT	0.167	1.130	401.167	51.217	7.200	0.041
1755	FOX LAKE	0.214	0.375	400.167	41.850	8.400	0.071
1756	OWASCO LAKE	0.101	0.420	401.000	41.100	5.400	0.041
1757	EAST LOON LAKE	0.071	0.120	450.000	22.100	14.400	0.041
1758	SLOCUM LAKE	0.055	0.200	407.333	221.100	5.400	0.352
1759	CEDAR LAKE	0.029	0.170	400.333	5.767	12.400	0.013
1761	LAKE WEMATUK	0.054	1.770	400.333	7.967	14.500	0.031
1762	RACCOON LAKE	0.134	0.310	404.333	14.217	13.400	0.020
1763	HALOWIN LAKE	0.044	0.140	401.167	11.333	11.200	0.027

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500- MEAN SEC	MEAN CHLORA	15- MIN DO	MEDIAN DISS ORTHO P
1764	LAKE VANDALIA	0.116	0.480	478.111	11.278	14.800	0.023
1765	OLD BEN MINE RESERVOIR	0.930	0.205	478.333	31.433	11.200	0.575
1766	HORSESHOE LAKE	0.127	0.705	482.833	182.250	6.800	0.018

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
1703	LAKE BLOOMINGTON	88 (26)	0 (0)	80 (24)	47 (14)	13 (2)	68 (20)	296
1706	LAKE CARLYLE	63 (19)	40 (12)	63 (19)	63 (19)	63 (19)	53 (16)	365
1708	LAKE CHARLESTON	37 (11)	7 (2)	0 (0)	77 (23)	77 (23)	27 (8)	225
1711	COFFEEN LAKE	97 (29)	77 (23)	93 (28)	93 (28)	2 (0)	92 (27)	454
1712	CRAB ORCHARD LAKE	67 (20)	90 (27)	43 (13)	20 (6)	42 (12)	85 (25)	347
1714	LAKE DECATUR	40 (12)	13 (4)	53 (16)	33 (10)	30 (8)	32 (9)	201
1725	LONG LAKE	7 (2)	43 (13)	40 (12)	30 (9)	72 (21)	3 (1)	195
1726	LAKE LOU YAEGER	30 (9)	37 (11)	7 (2)	87 (26)	57 (17)	23 (7)	241
1727	LAKE MARIE	60 (18)	68 (20)	73 (22)	37 (11)	23 (7)	42 (12)	303
1733	PISTAKEE LAKE	27 (8)	68 (20)	23 (7)	13 (4)	90 (27)	32 (9)	253
1735	RENO LAKE	77 (23)	80 (24)	70 (21)	50 (15)	53 (16)	92 (27)	422
1739	LAKE SHELBYVILLE	83 (25)	17 (5)	83 (25)	70 (21)	13 (2)	73 (22)	339
1740	SILVER LAKE (HIGHLAND)	20 (6)	47 (14)	10 (3)	97 (29)	13 (2)	42 (12)	229
1742	LAKE SPRINGFIELD	53 (16)	20 (6)	33 (10)	73 (22)	67 (20)	37 (11)	283
1748	VERMILION LAKE	50 (15)	3 (1)	47 (14)	43 (13)	37 (11)	47 (14)	227
1750	WONDER LAKE	13 (4)	50 (15)	20 (6)	7 (2)	80 (24)	13 (4)	183
1751	LAKE STORY	73 (22)	27 (8)	90 (27)	67 (20)	13 (2)	63 (19)	333
1752	DEPUE LAKE	10 (3)	10 (3)	3 (1)	23 (7)	83 (25)	10 (3)	139
1753	LAKE SANGCHRIS	88 (26)	30 (9)	67 (20)	57 (17)	30 (8)	97 (29)	369
1754	LAKE HOLIDAY	33 (10)	23 (7)	27 (8)	27 (8)	87 (26)	50 (15)	247
1755	FOX LAKE	23 (7)	63 (19)	17 (5)	17 (5)	72 (21)	20 (6)	212
1756	GRASS LAKE	17 (5)	53 (16)	50 (15)	10 (3)	97 (29)	17 (5)	244
1757	EAST LOON LAKE	70 (21)	100 (30)	97 (29)	53 (16)	2 (0)	77 (23)	399
1758	SLOCUM LAKE	3 (1)	87 (26)	13 (4)	0 (0)	100 (30)	7 (2)	210
1759	CEDAR LAKE	100 (30)	93 (28)	100 (30)	100 (30)	50 (15)	85 (25)	528
1761	LAKE HEMATUR	80 (24)	33 (10)	77 (23)	90 (27)	30 (8)	57 (17)	367
1762	RACCOON LAKE	57 (17)	73 (22)	30 (9)	60 (18)	42 (12)	68 (20)	330
1763	BALDWIN LAKE	93 (28)	97 (29)	87 (26)	80 (24)	47 (14)	100 (30)	504

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
1764	LAKE VANDALIA	47 (14)	60 (18)	60 (18)	83 (25)	13 (2)	60 (18)	323
1765	OLD MEN MINE RESERVOIR	0 (0)	83 (25)	57 (17)	40 (12)	60 (18)	0 (0)	240
1766	HORSESHOE LAKE	43 (13)	57 (17)	37 (11)	3 (1)	93 (28)	80 (24)	313

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	1754	CEDAR LAKE	528
2	1763	BALDWIN LAKE	504
3	1711	COFFEEN LAKE	454
4	1735	RENO LAKE	422
5	1757	EAST LOON LAKE	399
6	1753	LAKE SANGCHRIS	369
7	1761	LAKE BENATUR	367
8	1712	CRAB ORCHARD LAKE	347
9	1706	LAKE CARLYLE	345
10	1739	LAKE SHELBYVILLE	339
11	1751	LAKE STORY	333
12	1762	RACCOON LAKE	330
13	1764	LAKE VANDALIA	323
14	1766	HORSESHOE LAKE	313
15	1727	LAKE MARIE	303
16	1703	LAKE BLOOMINGTON	296
17	1742	LAKE SPRINGFIELD	283
18	1733	PISTAKEE LAKE	253
19	1754	LAKE HOLIDAY	247
20	1756	GRASS LAKE	244
21	1726	LAKE LOU YAEGER	241
22	1765	OLD BEN MINE RESERVOIR	240
23	1740	SILVER LAKE (HIGHLAND)	229
24	1748	VERMILION LAKE	227
25	1708	LAKE CHARLESTON	225
26	1755	FOX LAKE	212
27	1758	SLOCUM LAKE	210
28	1714	LAKE DECATUR	201

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
29	1725	LONG LAKE	195
30	1750	WONDER LAKE	183
31	1752	DEPUE LAKE	139

APPENDIX B

CONVERSIONS FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR ILLINOIS 10/23/75

LAKE CODE 1753 SANDUSKY LAKE

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 188.8

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
1753A1	188.8	1.24	1.83	2.29	2.36	1.86	1.55	0.94	0.49	0.35	0.39	0.56	0.67	1.21
1753B1	36.0	0.22	0.35	0.42	0.44	0.34	0.29	0.17	0.09	0.06	0.06	0.10	0.12	0.22
1753C1	15.5	0.09	0.15	0.18	0.19	0.15	0.13	0.07	0.04	0.02	0.02	0.04	0.05	0.09
1753D1	20.7	0.12	0.20	0.24	0.25	0.19	0.17	0.10	0.05	0.03	0.03	0.05	0.06	0.13
1753E1	32.6	0.20	0.32	0.39	0.40	0.31	0.27	0.16	0.08	0.05	0.06	0.09	0.10	0.20
1753Z2	83.9	0.60	0.81	1.06	1.10	0.87	0.69	0.45	0.24	0.18	0.21	0.29	0.33	0.57

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 188.8
SUM OF SUB-DRAINAGE AREAS = 188.8

TOTAL FLOW IN = 14.55
TOTAL FLOW OUT = 14.54

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
1753A1	6	73	7.31	3	1.08				
	7	73	1.67	8	0.24				
	8	73	0.0	19	0.0				
	9	73	0.0	8	0.0				
	10	73	0.0	14	0.0				
	11	73	0.23	3	0.02				
	12	73	1.27	2	0.76				
	1	74	7.25	5	0.82				
	2	74	3.74	2	2.44	16	4.16		
	3	74	3.06	2	3.79	16	2.97		
	4	74	2.15	6	1.61				
	5	74	2.58	4	0.59				
1753B1	6	73	1.64	3	0.21				
	7	73	0.31	8	0.04				
	8	73	0.02	19	0.0				
	9	73	0.00	8	0.0				
	10	73	0.00	14	0.0				
	11	73	0.04	3	0.00				
	12	73	0.22	2	0.13				
	1	74	1.30	5	0.15				
	2	74	0.71	2	0.45	16	0.79		
	3	74	0.57	2	0.71	16	0.57		
	4	74	0.40	6	0.28				
	5	74	0.48	4	0.11				

TRIBUTARY FLOW INFORMATION FOR ILLINOIS 10/23/75

LAKE CODE 1753 SANGCHRIS LAKE

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
1753C1	6	73	0.71	3	0.89				
	7	73	0.13	8	0.02				
	8	73	0.01	19	0.0				
	9	73	0.0	8	0.0				
	10	73	0.0	14	0.0				
	11	73	0.02	3	0.00				
	12	73	0.09	2	0.05				
	1	74	0.54	5	0.06				
	2	74	0.31	2	0.20	16	0.34		
	3	74	0.24	2	0.31	16	0.24		
	4	74	0.17	6	0.13				
	5	74	0.20	4	0.05				
175301	6	73	0.93	3	0.12				
	7	73	0.17	8	0.02				
	8	73	0.01	19	0.0				
	9	73	0.0	8	0.0				
	10	73	0.00	14	0.0				
	11	73	0.02	3	0.02				
	12	73	0.12	2	0.07				
	1	74	0.74	5	0.08				
	2	74	0.42	2	0.27	16	0.45		
	3	74	0.31	2	0.40	16	0.31		
	4	74	0.23	6	0.17				
	5	74	0.07	4	0.06				
1753E1	6	73	1.47	3	0.19				
	7	73	0.27	8	0.04				
	8	73	0.02	19	0.0				
	9	73	0.00	8	0.0				
	10	73	0.00	14	0.0				
	11	73	0.03	3	0.00				
	12	73	0.20	2	0.12				
	1	74	1.16	5	0.14				
	2	74	0.65	2	0.42	16	0.74		
	3	74	0.51	2	0.65	16	0.51		
	4	74	0.37	6	0.27				
	5	74	0.12	4	0.10				
1753Z2	6	73	3.82	3	0.48				
	7	73	0.79	8	0.11				
	8	73	0.05	19	0.0				
	9	73	0.01	8	0.0				
	10	73	0.01	14	0.01				
	11	73	0.11	3	0.01				
	12	73	0.65	2	0.40				
	1	74	3.51	5	0.40				
	2	74	1.64	2	1.08	16	1.84		
	3	74	1.42	2	1.73	16	1.36		
	4	74	0.99	6	0.76				
	5	74	1.78	4	0.28				

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 75/10/23

175301
39 38 40.0 089 28 50.0
LAKE SANGCHRIS
17021 ILLINOIS

IIEPALES
3

2111202
0028 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/07	13 30	0000	18.3		10	380	8.10	79	0.080	0.600	4.340	0.024
	13 30	0004	18.3	8.2		380	8.10	77	0.090	0.500	4.510	0.024
	13 30	0015	18.3	8.2		380	8.00	77	0.090	0.500	4.380	0.025
	13 30	0025	18.3	8.2		380	8.00	78	0.070	0.500	4.380	0.024
73/08/10	09 40	0000	31.1		36	443	8.30	97	0.070	1.000	1.980	0.008
	09 40	0005	31.1	7.0		443	7.80	96	0.030	0.600	1.940	0.006
	09 40	0015	29.0	7.6		431	7.60	93	0.040	0.800	1.860	0.006
	09 40	0028	24.3	0.5		353	7.20	105	0.390	1.100	1.670	0.006
73/10/18	09 20	0000	21.2		34	401	8.00	92	0.040	0.900	0.290	0.012
	09 20	0005	21.2	7.4		402	8.00	93	0.030	0.600	0.300	0.011
	09 20	0015	21.0	7.4		400	7.90	93	0.030	0.500	0.300	0.011
	09 20	0033	19.8	7.2		390	7.90	92	0.040	0.500	0.320	0.011

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/07	13 30	0000	0.102	2.8
	13 30	0004	0.120	
	13 30	0015	0.102	
	13 30	0025	0.095	
73/08/10	09 40	0000	0.037	40.6
	09 40	0005	0.026	
	09 40	0015	0.025	
	09 40	0028	0.021	
73/10/18	09 20	0000	0.040	12.4
	09 20	0005	0.047	
	09 20	0015	0.049	
	09 20	0033	0.065	

STORET RETRIEVAL DATE 75/10/23

175302
39 37 40.0 089 27 35.0
LAKE SANGCHRIS
17021 ILLINOIS

11EPALES
3

2111202
0030 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/07	14 00	0000	18.9		8	380	8.00	78	0.080	0.600	4.250	0.025
	14 00	0004	18.9	7.8		380	8.10	78	0.090	0.500	4.290	0.024
	14 00	0015	18.9	8.2		380	8.00	77	0.080	0.500	4.350	0.025
	14 00	0026	18.9	8.0		380	8.00	77	0.070	0.500	4.320	0.023
73/08/10	10 10	0000	32.2		28	454	8.20	96	0.050	1.000	2.000	0.005
	10 10	0005	31.8	6.2		447	8.30	97	0.050	0.700	1.950	0.007
	10 10	0015	29.1	5.8		423	8.40	97	0.060	0.800	1.910	0.007
	10 10	0023	27.5	2.0		425	8.30	99	0.170	1.200	1.700	0.011
73/10/18	09 50	0000	22.4		34	418	8.00	89	0.050	0.700	0.280	0.007
	09 50	0005	21.8	7.6		414	8.00	88	0.030	0.500	0.290	0.008
	09 50	0015	21.2	7.2		407	8.00	91	0.050	0.400	0.270	0.010
	09 50	0029	20.2	7.4		397	8.10	90	0.060	0.500	0.210	0.008

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/07	14 00	0000	0.114	3.4
	14 00	0004	0.115	
	14 00	0015	0.104	
	14 00	0026	0.115	
73/08/10	10 10	0000	0.024	40.0
	10 10	0005	0.048	
	10 10	0015	0.049	
	10 10	0023	0.134	
73/10/18	09 50	0000	0.042	14.9
	09 50	0005	0.043	
	09 50	0015	0.044	
	09 50	0029	0.056	

STORET RETRIEVAL DATE 75/10/23

175303
39 35 50.0 089 26 45.0
LAKE SANGCHRIS
17021 ILLINOIS

11EPALES
3

2111202
0019 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/07	14	30 0000	16.6		2	340	8.00	69	0.120	0.700	4.280	0.042
	14	30 0004	16.6	8.8		340	8.00	70	0.110	0.600	4.250	0.040
	14	30 0015	16.5	8.8		335	8.00	67	0.140	0.500	4.300	0.042
73/08/10	10	30 0000	30.0		33	424	8.90	97	0.050	0.900	1.880	0.007
	10	30 0005	28.9	8.0		418	8.80	98	0.040	0.800	1.940	0.007
	10	30 0013	28.2	8.4		410	8.20	97	0.040	0.700	1.840	0.009
73/10/18	10	10 0000	20.1		35	396	8.40	89	0.030	0.600	0.220	0.005
	10	10 0014	18.8	8.8		380	8.40	94	0.040	0.700	0.100	0.007

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/07	14	30 0000	0.156	2.5
	14	30 0004	0.153	
	14	30 0015	0.142	
73/08/10	10	30 0000	0.050	48.8
	10	30 0005	0.047	
	10	30 0013	0.050	
73/10/18	10	10 0000	0.042	22.3
	10	10 0014	0.053	

STORET RETRIEVAL DATE 75/10/23

175304
39 36 40.0 089 29 30.0
LAKE SANGCHRIS
17021 ILLINOIS

11EPALES
3

2111202
0014 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 N02&N03 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/07	14	50 0000	16.8		4	380	8.00	74	0.080	0.600	4.290	0.028
	14	50 0004	16.8	8.6		380	8.00	76	0.080	0.400	4.300	0.026
	14	50 0010	16.7	8.8		380	8.00	64	0.080	0.400	4.250	0.025
73/08/10	10	45 0000	29.8		36	424	8.80	99	0.040	0.900	1.860	0.006
	10	45 0005	29.3	7.8		423	8.60	98	0.030	0.700	1.910	0.006
	10	45 0014	28.9	6.8		422	8.60	99	0.040	0.600	1.950	0.006
73/10/18	10	35 0000	19.9		35	393	8.00	89	0.030	0.600	0.320	0.006
	10	35 0005	19.9	7.8			7.90	90	0.030	0.600	0.320	0.008
	10	35 0018	19.7	8.0		390	7.90	93	0.040	0.500	0.320	0.008

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/07	14	50 0000	0.096	4.3
	14	50 0004	0.094	
	14	50 0010	0.079	
73/08/10	10	45 0000	0.035	26.6
	10	45 0005	0.035	
	10	45 0014	0.047	
73/10/18	10	35 0000	0.035	12.9
	10	35 0005	0.038	
	10	35 0018	0.052	

APPENDIX E

TRIBUTARY and WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 75/10/23

17SSAI
39 39 00.0 084 28 35.0
UNNAMED CREEK
17011 CHRISTIAN CO MAP
O/SANG CHIS LAKE
CHRISTIAN CO MAY 20 MNDD JUST MELO DAM
11EPALES 2111204
N 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	11	20	3.900	2.400	0.054	0.012	0.045
73/07/08	10	40	3.500	0.970	0.033	0.010	0.030
73/08/19	10	25	1.000	1.050	0.246	0.024	0.050
73/09/08	11	00	0.210	1.700	0.370	0.105	0.135
73/10/14	09	45	0.430	0.800	0.220	0.054	0.120
73/11/03	10	45	0.460	0.800	0.092	0.054	0.145
73/12/02	09	45	0.420	0.500	0.032	0.048	0.085
74/01/05	10	00	0.900	0.400	0.068	0.010	0.030
74/02/02	14	45	2.760	0.500	0.070	0.030	0.055
74/02/16	09	45	3.200	0.600	0.080	0.030	0.055
74/03/02	10	00	3.600	0.800	0.060	0.015	0.055
74/03/16	10	00	4.115	0.650	0.075	0.015	0.047
74/04/06	10	00	3.960	0.800	0.015	0.010	0.035
74/05/04	09	50	3.600	0.500	0.050	0.010	0.050

STORET RETRIEVAL DATE 75/10/23

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 17JUN91
39 32 40.0 089 26 10.0
CLEAR CREEK (EASTERN
17       CHRISTIAN CO MAP
T/SANG CRIS LAKE
SEC RD BRDG 2.5 MI SW OF KINCAID
ILEPALES                    2111204
4                           0000 FEET  DEPTH
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DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	10 55		6.500	1.760	0.110	0.035	0.095
73/07/08	10 15		7.900	0.440	0.063	0.030	0.070
73/08/19	10 03		2.000	1.600	0.066	0.060	0.145
73/09/08	10 35			2.900	0.096	0.063	0.230
73/10/14	09 25		1.760	1.450	0.130	0.120	0.300
73/11/03	10 30		1.680	1.100	0.052	0.078	0.300
73/12/02	09 40		3.960	0.400	0.044	0.052	0.080
74/01/05	09 45		7.200	0.200	0.016		0.036
74/02/02	14 30		7.560	0.400	0.040	0.040	0.055
74/02/16	09 30		7.200	0.200	0.022	0.022	0.045
74/03/02	09 40		7.500	0.900	0.035	0.040	0.090
74/03/16	09 40		7.800	0.400	0.025	0.030	0.075
74/04/06	09 45		7.500	0.500	0.010	0.035	0.090
74/05/04	09 30		7.700	0.500	0.025	0.030	0.090

STREET RETRIEVAL DATE 75/10/23

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	10 45		5.700	0.540	0.052	0.012	0.045
73/07/08	10 05		7.400	0.150	0.031	0.013	0.050
73/08/14	09 55		0.250	2.600	0.290	0.037	0.170
73/09/04	10 15		0.510	3.400	0.380	0.300	
73/10/14	09 15		0.360	0.900	0.063	0.034	0.145
73/11/03	10 10		0.310	1.550	0.060	0.030	0.040
73/12/02	09 30		2.000	0.800	0.072	0.020	0.055
74/01/05	09 35		7.800	0.200	0.016	0.012	0.025
74/02/02	14 15		8.400	0.100K	0.012	0.020	0.020
74/02/16	09 20		7.900	0.200	0.015	0.010	0.025
74/03/02	09 30		8.400	0.500	0.015	0.015	0.040
74/03/16	09 30		8.600	0.400	0.015	0.010	0.025
74/04/06	09 40		8.000	0.600	0.020	0.015	0.015
74/05/04	09 15		6.500	0.950	0.035	0.005	0.030

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

175301
39 34 30.0 089 30 00.0
UNNAMED CREEK
17 CHRISTIAN CO MAP
T/SANG CHRIS LAKE
SEC RD BRDG 1 MI S# OF SICILY
ILLPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	10 35		6.700	2.800	0.088	0.030	0.120
73/07/08	09 55		8.600	0.200	0.072	0.028	0.095
73/08/19	09 45		1.200	1.980	0.046	0.044	0.165
73/09/08	09 50		0.105	1.800	0.073	0.198	0.360
73/10/14	09 10		0.300	1.050	0.079	0.072	0.220
73/11/03	10 00		1.140	1.200	0.052	0.069	0.375
73/12/02	09 15		1.380	1.600	0.060	0.056	0.056
74/01/05	09 25		7.980	0.300	0.020	0.016	0.025
74/02/02	14 10		8.900	0.100	0.015	0.025	0.027
74/02/16	09 15		8.200	0.300	0.015	0.015	0.040
74/03/02	09 25		8.800	0.500	0.010	0.025	0.055
74/03/16	09 25		9.000	0.200	0.015	0.020	0.045
74/04/06	09 30		8.200	0.500	0.025	0.030	0.045
74/05/04	09 05		7.400	0.700	0.020	0.015	0.065

STORET RETRIEVAL DATE 75/10/23

17 03E1
39 33 50.0 089 32 40.0
CLEAR CREEK (WESTERN)
17 SANGAMON CO MAP
17SANG CHRIS LAKE
SEC NO ANOD 2 MI SE OF MANSEE
11:ALES 21112G4
0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO3&NO2 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	03671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	10 25		8.100	0.250	0.110	0.055	0.125
73/07/08	09 45		4.600	0.220	0.052	0.040	0.070
73/08/14	09 30		1.300	1.950	0.092	0.132	0.200
73/09/08	09 45		2.700	2.410	0.370	0.244	0.340
73/10/14	09 00		2.300	2.000	0.110	0.273	0.350
73/11/03	09 45		6.800	1.250	0.056	0.154	0.260
73/12/02	09 00		4.100	0.900	0.056	0.088	0.110
74/01/05	09 10		8.400	0.300	0.010	0.032	0.050
74/02/02	13 50		9.200	0.200	0.015	0.040	0.055
74/02/18	09 10		8.700	0.200	0.015	0.030	0.050
74/03/02	09 20		8.500	0.600	0.015	0.045	0.100
74/03/18	09 20		8.800	0.400	0.015	0.040	0.065
74/04/06	09 30		8.100	0.500	0.020	0.045	0.085
74/05/04	09 00		8.700	0.500	0.025	0.035	0.080

STORET RETRIEVAL DATE 75/10/23

175321 T-175321 P000070
39 39 00.0 089 28 35.0
COMMONWEALTH EDISON STATN DSCHRG
17021 CHRISTIAN COUNTY
U/SANG CHRIS RESERVOIR
SANG CHRIS RESERVOIR
FEMALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/07/24	13 30		2.100	2.800	0.480	0.720	1.100	690.000	690.000
73/08/10	15 00		1.540	0.860	0.270	0.100	1.160	690.000	690.000
73/09/26	00 00		0.360	0.665	0.530	0.110		690.000	690.000
73/10/24			0.252	0.650	0.005R	0.273	0.510	690.000	690.000
73/11/28			0.360	0.530	0.046	0.062	0.260	690.000	690.000
74/02/25	12 00		3.520	1.000R	0.050R	0.050R	0.056	690.000	690.000
74/03/20			4.000	1.000R	0.110	0.077	0.097	690.000	690.000
74/04/16			4.300	1.000R	0.050R	0.220	0.170	690.000	690.000
74/05/21			3.400	1.000R	0.072	0.022	0.030	690.000	690.000
74/06/11			3.900	1.000R	0.050R	0.088	0.100	690.000	690.000
74/07/17			3.340	1.000R	0.150	0.069	0.110	690.000	690.000
74/08/14			1.920	1.000R	0.050R	0.063	0.110	690.000	690.000

R VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

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 175331          ST175331      P000550
38 39 00.0 085 28 35.0
COMMONWEALTH EDISON TURK PUMPHOU
17       CHRISTIAN COUNTY
D/SANG CHRIS RESERVOIR
SANG CHRIS RESERVOIR
ILLINOIS                  2141204
4                         0000 FEET  DEPTH
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DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/07/24	13 30		5.900	0.130	0.130	0.150	0.320	0.04R	0.04R
73/08/10	15 00		0.920	1.600	0.140	0.070	2.300	0.04R	0.04R
73/09/26	00 00		2.600	3.400	0.010R	0.020	0.375	0.04R	0.04R
73/10/24			2.900	1.700	0.022	0.03R	0.059	0.04R	0.04R
73/11/28			5.100	0.500R	0.024	0.140	0.340	0.04R	0.04R
74/02/26	12 00		7.200	1.000R	0.050R	0.050R	0.910	0.04R	0.04R
74/03/20			6.000	1.200	0.094	0.056	0.348	0.04R	0.04R
74/04/16			5.520	1.000R	0.084	0.150	0.330	0.04R	0.04R
74/05/21	13 00		4.900	1.000R	0.050R	0.110	0.950	0.04R	0.04R
74/06/11			7.800	1.000R	0.120	0.056	0.220	0.04R	0.04R
74/07/17			4.000	1.000R	0.140	0.055	0.055	0.04R	0.04R
74/08/14			4.100	1.000R	0.050R	0.050R	0.270	0.04R	0.04R

R VALUE KNOWN TO BE
LESS THAN INDICATED